

December 2001

Chetco River and Boat Basin Sediment Quality Evaluation

ABSTRACT

This evaluation was conducted following procedures set forth in the Inland Testing Manual and the Ocean Disposal Testing Manual (Green Book), developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material. Guidelines used are those developed to implement the Clean Water Act and the Marine Protection, Research and Sanctuary Act. These guidelines and associated screening levels are those adopted for use in the Dredge Material Evaluation Framework (DMEF) for the Lower Columbia River Management Area, November 1998.

A total of six (6) sediment samples were collected from the Chetco River Federal channel and boat basin entrance channel on August 21, 2001. All samples were submitted for physical analyses including total volatile solids. Three (3) sediment samples were analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls, organotin, phenols, phthalates, miscellaneous extractables, and polynuclear aromatic hydrocarbons.

The level for nickel in sample CHET-P-01 and the levels for silver in all three samples were initially found to be at or above the SLs for these metals; this result was suspected to be a lab error. To verify the results, the lab reanalyzed the samples, in duplicate, for nickel and silver. The results for silver showed good correlation, were well below the SL for silver and therefore, did not verify the earlier hits for silver (see notation regarding silver analysis in the reference section). The reanalysis of nickel, while at the SL, was not substantially less than the original analysis and should be further characterized by re-sampling and analysis to verify its presence in the dredging prism.

The lab had concerns that the original analysis for the semi-volatile method 8270 was suspect and elected to reanalyze the sample three (3) times. During laboratory analysis #3, samples CHET-P-01 and CHET-P-02 each had a value of 2100 ug/kg for 3- & 4-Methylphenol, which greatly exceeds the SL for this contaminant. The values reported for these samples during laboratory analysis #1 and #2, however, were below the SL. Because of the uncertainty associated with the varied results, it is recommended that the sediment associated with CHET-P-01 and CHET-P-02 be re-sampled and reanalyzed.

None of the other contaminants tested were found to be at or above their respective SLs in the remaining four (4) samples. Therefore, with the exception of CHET-P-01 and CHET-P-02, the sediments represented by these samples are determined to be suitable for unconfined, in-water placement without further characterization.

INTRODUCTION

This report characterizes the sediment to be dredged at Chetco River Federal channel and boat basin entrance channel for the purposes of dredging and disposal. The sampling and analysis objectives are stated in the Sampling and Analysis Plan (SAP August 2001), and are also listed below. This report will outline the procedures used to accomplish these objectives.

Sampling and Analysis Objectives

- Characterize sediments in accordance with the regional dredge material testing manual, the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF; to be expanded to include all of Oregon).
- Collect, handle and analyze representative sediment of the purposed dredging prism, in accordance with protocols and Quality Assurance/Quality Control (QA/QC) requirements.
- Characterize sediments to be dredged for evaluation of suitable disposal methods.
- Conduct physical and chemical characterization only for this sediment evaluation, unless DMEF screening levels are exceeded and further characterization (Tier III Biological Assays) is needed to determine disposal method.

PREVIOUS STUDIES

The U.S. Army Corps of Engineers (Corps), Portland District, routinely evaluates sediment from its projects on a 5-year rotation. Physical and chemical evaluation sampling was performed at Chetco River starting in 1982 and continued in 1991 and 1996. The results of these studies revealed the sediment, especially in Federal channel areas, to be predominately sand (>80%) with volatile solids <5% (with some exceptions). Sediments from the previous studies were determined to be suitable for in-water disposal.

In the June 1996 sampling event, 14 samples were collected using a Ponar sampling device, with a penetration depth of approximately 9 cm. All samples were submitted for physical analyses, with 9 samples being further subjected to chemical analyses, including total volatile solids (TVS), total organic carbon (TOC), metals (8 inorganic), organotin (TBT), polynuclear aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs). Additional samples were collected in the boat basins as part of an U.S. Environmental Protection Agency (EPA) funded study.

CURRENT SAMPLING EVENT/DISCUSSION

A total of six (6) sediment samples were collected from the Chetco River Federal channel and boat basin entrance channel on August 21, 2001 (see Figure 1 and Table 1). The samples were collected using a Ponar sampling device. All samples were submitted for physical analyses including TVS. Three (3) sediment samples were analyzed for metals (9 inorganic), TOC, pesticides, PCBs, organotin, phenols, phthalates, miscellaneous extractables, and PAHs.

**Table 1. Sample Location Coordinates
(NAD 83, Oregon State Plane South)**

CHET-P-01	42° 02' 57.78" 124° 16' 3.3"	CHET-P-04	42° 02' 50.1" 124° 16' 4.62"
CHET-P-02	42° 02' 52.92" 124° 16' 2.34"	CHET-P-05	42° 02' 44.52" 124° 16' 9.48"
CHET-P-03	42° 02' 50.82" 124° 15' 59.58"	CHET-P-06	42° 02' 38.34" 124° 16' 13.14"

RESULTS

Physical and Volatile Solids (ASTM methods). All six (6) samples were submitted for physical and TVS analyses and the data are presented in Table 1. Five (5) samples exceeded 20% fines and/or 5% volatile solids. Four these samples were classified as "sandy silt" and three of these were black in color; the other sample was classified as "silty sand." The remaining sample submitted did not exceed 20% fines and/or 5% volatile solids and was classified as "poorly graded sand." Mean grain size for all the samples is 0.1162 mm, with 0.33% gravel, 69.48% sand and 30.19% fines. Volatile solids for all the samples ranged from 2.37% to 14.56%.

The material represented by CHET-P-04 should have been analyzed for chemicals of concern due to the physical testing results of 56.23% sand and 43.77% fines with 10.10% volatile solids; however, the number of samples collected exceeds that necessary for the volume of dredge material proposed for dredging. Average annual dredging volume in recent years is about 40,000 cubic yards.

Metals (EPA method 6020/7471), Total Organic Carbon (EPA method 9060). Three (3) samples were submitted for testing and the data are presented in Table 2. The TOC ranged from 15,000 to 35,000 mg/kg in the samples.

Low levels of most metals were found, but most did not approach the screening level (SL), except for nickel in one sample (CHET-P-01), which exceeded the SL and silver in all

three samples, which were at or exceeded the SL. The results for nickel and silver were suspected to be in error since the lab was having a problem particularly with their silver analyses (the sediment evaluation reports that showed a lab problem with the silver analysis are listed on the reference page).

To verify the results, the lab reanalyzed CHET-P-01 for nickel, in duplicate, and the levels were found to be 141 mg/kg and 140 mg/kg (duplicate), which show good correlation and are at the SL. The reanalysis of nickel, while at the SL, was not substantially less than the original analysis and should be further characterized by re-sampling and analysis to verify its presence in the dredging prism. The lab also reanalyzed all three samples for silver, in duplicate, and the levels were found to be 0.23 mg/kg and 0.82 mg/kg (duplicate) for CHET-P-01; 0.097 mg/kg and 0.25 mg/kg (duplicate) for CHET-P-02; and 0.22 mg/kg and 0.14 mg/kg (duplicate) for CHET-P-03. These values also showed good correlation and were well below the SL.

Organotin (TBT; pore water method). Three (3) samples were tested and the data are presented in Table 3. Organotin was not detected at the method detection limit (MDL) in the samples.

Pesticides/PCBs (EPA method 8081A/8082), Phenols, Phthalates and Miscellaneous Extractables (EPA method 8270). Three (3) samples were tested for pesticides/PCBs and the data are presented in Table 4. No PCBs or pesticides (including DDT) were found at the MDL. Total DDT and its breakdown products, DDD and DDE, were not detected above the MDL.

For each of the three (3) samples, three laboratory analyses were conducted for phenols, phthalates, and miscellaneous extractables and the data are presented in Tables 4, 5 and 6. All levels for phenols, phthalates, and miscellaneous extractables were found to be below their respective SLs, except for 3- & 4-Methylphenol. During laboratory analysis #3, two samples had a value of 2100 ug/kg for 3- & 4-Methylphenol, which greatly exceeds the SL of 670 ug/kg. The values reported for these samples during laboratory analysis #1 and #2, however, were below the SL.

Polynuclear Aromatic Hydrocarbons (EPA method 8270C). For each of the three (3) samples, three laboratory analyses were conducted for PAHs and the data are presented in Tables 7, 8 and 9 for “low molecular weight” PAHs and in Tables 10, 11 and 12 for “high molecular weight” PAHs. Low levels of some “low molecular weight” PAHs were found in all the samples and did not approach their respective SLs. Laboratory analysis #3 (Table 9) showed the highest levels ranging from not detectable above the MDL to a high of 5.1% of the SL for phenanthrene. Low levels of some “high molecular weight” PAHs were found in all samples and did not approach their respective SLs. Laboratory analysis #3 (Table 12) showed the highest levels ranging from not detectable above the MDL to a high of 8.2% of the SL for fluoranthene.

CONCLUSION

Collection and evaluation of the sediment data was completed using guidelines from the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF). The DMEF is a regional manual developed jointly with regional EPA, Corps, Oregon Department of Environmental Quality and Washington Departments of Ecology and Natural Resources. This document is a guideline for implementing the Clean Water Act (40 CFR 230), Section 404 (b)(1), and for the Marine Protection, Research and Sanctuary Act (MPRSA). The screening levels used are those adopted for use in the DMEF, final November 1998. The DMEF tiered testing approach requires that material in excess of 20% fines and greater than 5% volatile solids, as well as any material with prior history or is suspected (“reason to believe”) of being contaminated, be subjected to chemical as well as physical analyses.

A total of six (6) sediment samples were collected from the Chetco River Federal channel and boat basin entrance channel on August 21, 2001. Physical analyses were run on each sample. Three (3) samples were submitted for chemical analyses.

The level for nickel in sample CHET-P-01 and the levels for silver in all three samples were initially found to be at or above the SLs for these metals; this result was suspected to be a lab error. To verify the results, the lab reanalyzed the samples, in duplicate, for silver. These results showed good correlation, were below the SL for silver and therefore, did not verify the earlier hits for silver.

To verify the results for nickel, the lab reanalyzed CHET-P-01, in duplicate, and the levels of nickel were found to be 141 mg/kg and 140 mg/kg (duplicate), which show good correlation and are at the SL. The reanalysis of nickel, while at the SL, was not substantially less than the original analysis, and should be further characterized by re-sampling and analysis to verify its presence in the dredging prism.

The material represented by CHET-P-04 wasn’t analyzed for chemicals of concern even though the physical testing results were 56.23% sand and 43.77% fines with 10.10% volatile solids. However, the number of samples collected for the project exceeds that necessary for the volume of dredge material proposed for dredging. Average annual dredging volume in recent years is about 40,000 cubic yards.

The lab had concerns that the original analysis for the semi-volatile method 8270 was suspect and elected to reanalyze the sample three (3) times. During laboratory analysis #3, samples CHET-P-01 and CHET-P-02 each had a value of 2100 ug/kg for 3- & 4-Methylphenol, which greatly exceeds the SL for this contaminant. The values reported for these samples during laboratory analysis #1 and #2, however, were below the SL. Because of the uncertainty associated with the varied results, it is recommended that the sediment associated with CHET-P-01 and CHET-P-02 be re-sampled and reanalyzed. None of the other contaminants tested were found to be at or above their respective SLs in the remaining four (4) samples. Therefore, with the exception of CHET-P-01 and CHET-P-02, the sediments represented by these samples are determined to be suitable for unconfined, in-water placement without further characterization.

REFERENCES

1. U.S. Army Corps of Engineers, Portland District and Seattle District; U.S. Environmental Protection Agency, Region 10; Oregon Department of Environmental Quality; Washington State Department of Natural Resources and Department of Ecology. 1998 Final. Dredge Material Evaluation Framework for the Lower Columbia River Management Area.
2. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. February 1998. Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual (referred to as the "Inland Testing Manual").
3. Clean Water Act, 40 CFR 230 (b)(1).
4. U.S. Army Corps of Engineers. August 2001. Sediment Sampling and Analysis Plan, Chetco River Channel and Boat Basin Entrance. Portland District.
5. U.S. Army Corps of Engineers. 1996. Characteristics of Sediment at Chetco Boat Basin and Entrance on the Chetco River, 1996. Portland District.

The following reports, prepared by the U.S. Army Corps of Engineers, Portland District, December 2001, also showed a lab problem with the silver analysis:

Coquille River and Boat Basin, Sediment Quality Evaluation
Skipanon Entrance Channel and Boat Basin, Sediment Quality Evaluation
Oregon Slough Entrance Channel, Sediment Quality Evaluation
Columbia River Channel Deepening (CRCD), Station #76 (CR-BC-76),
Sediment Quality Evaluation

Table 1. Chetco River and Boat Basin**Sampled August 21, 2001**

Physical Analysis & Volatile Solids

Sample I.D.	Grain Size (mm)		Percent			
	Median	Mean	Gravel	Sand	Silt/Clay	Volatile Solids
CHET-P-01	0.072	0.0615	0.00	58.83	41.17	6.46
CHET-P-02	0.081	0.2257	1.97	57.06	40.97	14.56
CHET-P-03	0.073	0.0871	0.00	57.82	42.18	10.33
CHET-P-04	0.071	0.0836	0.00	56.23	43.77	10.10
CHET-P-05	0.13	0.0953	0.00	87.85	12.15	6.18
CHET-P-06	0.18	0.1441	0.00	99.08	0.92	2.37
Mean	0.101	0.1162	0.33	69.48	30.19	8.33
Minimum	0.071	0.0615	0.00	56.23	0.92	2.37
Maximum	0.18	0.2257	1.97	99.08	43.77	14.56

Table 2. Chetco River and Boat Basin

Sampled August 21, 2001

Inorganic Metals and TOC

Sample I.D.	As	Sb	Cd	Cu	Pb	Hg	Ni	Ag	Zn	TOC
	mg/kg (ppm)									
CHET-P-01	7.6	<0.052	0.88 J	170	13	0.13	160*	30*	150	15000
CHET-P-02	2.7	0.35 J	1.1	62	5	<0.045	63	6.1*	53	35000
CHET-P-03	4	0.21 J	0.69 J	92	8.1	0.059 J	90	11*	75	17000
Screening level (SL)	57	150	5.1	390	450	0.41	140	6.1	410	

* Nickel (Ni) for sample CHET-P-01 was reanalyzed 10/4/01; the result was 141 mg/kg (duplicate = 140 mg/kg).

* Silver (Ag) for sample CHET-P-01 was reanalyzed 10/4/01; the result was 0.23 (J) mg/kg (duplicate = 0.82 mg/kg).

* Silver (Ag) for sample CHET-P-02 was reanalyzed 10/4/01; the result was 0.097 (J) mg/kg (duplicate = 0.25 mg/kg).

* Silver (Ag) for sample CHET-P-03 was reanalyzed 10/4/01; the result was 0.22 mg/kg (duplicate = 0.14 mg/kg).

J = Estimated value (reported values are above the MDL, but below the PQL).

Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).

Table 3. Chetco River and Boat Basin

Sampled August 21, 2001

Organotin

Interstitial (Pore) Water

Sample I.D.	Tetrabutyltin	Tributyltin	Dibutyltin	Monobutyltin	Total TBT
	ug/L (ppb)				
CHET-P-01	<0.0032	<0.0045	<0.0032	<0.003	ND
CHET-P-02	<0.0025	<0.0036	<0.0025	<0.0024	ND
CHET-P-03	<0.0026	<0.0037	<0.0026	<0.0025	ND
Screening level (SL)	+	+	+	+	0.15
TBT = Total organotin (interstitial water). Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).					

Table 4. Chetco River and Boat Basin

Sampled August 21, 2001

Pesticides, PCBs*, Phenols, Phthalates and Extractables

Laboratory Analysis #1

Sample I.D.	Pesticides				Phenols			Phthalates				Extract-ables	Other	
	ug/kg (ppb)													
	4,4'-DDD	4,4'-DDE	4,4'-DDT	Total DDT	Phenol	3- & 4-Methyl-phenol	4-Nitro-phenol	bis(2-Ethylhexyl) phthalate	Butyl-benzyl-phthalate	Di-n-butyl-phthalate	Diethyl-phthalate	Dibenzo-furan	2,6-Dinitro-toluene	Nitro-benzene
CHET-P-01 (A)	<0.5	<0.59	<0.66	ND	79	300	<6.6	42 J B1	<6.6	<30	<5.9 J	5.2 J	<6.2	<4.7
CHET-P-02 (A)	<0.34	<0.4	<0.45	ND	52	280	<4.5	22 J B1	7.5 J	<21	4.2 J	<2.7	<4.2	<3.2
CHET-P-03 (A)	<0.35	<0.42	<0.47	ND	36	240	<4.5	48 J B1	5.9 J	<21	<4	<2.7	<4.3	<3.2
Screen level (SL)	DDD + DDE + DDT = 6.9				420	670	**	8300	970	5100	1200	540	**	**
<p>* No PCBs were found at the MDL (SL = 130 ppb).</p> <p>** SL not established.</p> <p>J = Estimated value (reported values are above the MDL, but below the PQL).</p> <p>B1 = Low-level contamination was present in the method blank (reported level was < 10 times blank concentration).</p> <p>Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).</p>														

Table 5. Chetco River and Boat Basin

Sampled August 21, 2001

Phenols, Phthalates and Extractables

Laboratory Analysis #2

Sample I.D.	Phenols			Phthalates				Extractables	Other	
	ug/kg (ppb)									
	Phenol	3- & 4-Methyl-phenol	4-Nitro-phenol	bis(2-Ethylhexyl) phthalate	Butyl-benzyl-phthalate	Di-n-butyl-phthalate	Diethyl-phthalate	Dibenzo-furan	2,6-Dinitro-toluene	Nitro-benzene
CHET-P-01 (B)	54	580	<6.4	25 J	<6.4	<29	<5.7	<3.9	<6	<4.6
CHET-P-02 (B)	26	380	5.9 J	11 J	<4.7	<21	<4.2	<2.8	<4.4	<3.4
CHET-P-03 (B)	9.7 J	210	<4.1	<8.9	<4.1	<19	<3.7	<2.5	<3.9	<3
Screen level (SL)	420	670	*	8300	970	5100	1200	540	*	*
* SL not established.										
J = Estimated value (reported values are above the MDL, but below the PQL).										
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).										

Table 6. Chetco River and Boat Basin

Sampled August 21, 2001

Phenols, Phthalates and Extractables

Laboratory Analysis #3

Sample I.D.	Phenols			Phthalates				Extractables	Other	
	ug/kg (ppb)									
	Phenol	3- & 4-Methyl-phenol	4-Nitro-phenol	bis(2-Ethylhexyl) phthalate	Butyl-benzyl-phthalate	Di-n-butyl-phthalate	Diethyl-phthalate	Dibenzo-furan	2,6-Dinitro-toluene	Nitro-benzene
CHET-P-01 (C)	46	2100*	<6.6	48 J	52 B1	39 J B1	7.9 J	21 J	<6.2	<4.7
CHET-P-02 (C)	89	2100*	<4.1	17 J	16 J B1	19 J B1	<3.7 J	<2.5	7.4 J	<3
CHET-P-03 (C)	10 J	160	<3.8	16 J	18 J B1	22 J B1	3.6 J	2.4 J	<3.6	52
Screen level (SL)	420	670	**	8300	970	5100	1200	540	**	**
<p>* Previous values reported for CHET-P-01 (300 and 580 ug/kg) and for CHET-P-02 (280 and 380 ug/kg) were below the SL. The 2100 ug/kg was reported from the third analysis.</p> <p>** SL not established.</p> <p>J = Estimated value (reported values are above the MDL, but below the PQL).</p> <p>B1 = Low-level contamination was present in the method blank (reported level was < 10 times blank concentration).</p> <p>Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)</p>										

Table 7. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
Low Molecular Weight Analytes, Laboratory Analysis #1
ug/kg (ppb)

Sample I.D.	Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methyl naphthalene	Naphthalene	Phen- anthrene	Total Low PAHs
CHET-P-01 (A)	3.8	<1.5	4.5	7.2	<0.54	6.9	44	66.4
CHET-P-02 (A)	<1.2	<1	2.6	<1.1	<0.37	<1.1	10	12.6
CHET-P-03 (A)	<1.2	<1	4.3	<1.1	<0.37	<1.1	5.4	9.7
Screen level (SL)	500	560	960	540	670	2100	1500	5200
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)								

Table 8. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
Low Molecular Weight Analytes, Laboratory Analysis #2
ug/kg (ppb)

Sample I.D.	Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methyl naphthalene	Naphthalene	Phen- anthrene	Total Low PAHs
CHET-P-01 (B)	<1.7	<1.5	5	4	<0.52	6.7	20	35.7
CHET-P-02 (B)	<1.2	<1.1	3.4	<1.1	<0.38	3.2	3.2	9.8
CHET-P-03 (B)	<1.1	<0.94	<0.55	<1	<0.34	<1	<0.46	ND
Screen level (SL)	500	560	960	540	670	2100	1500	5200
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)								

Table 9. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
Low Molecular Weight Analytes, Laboratory Analysis #3
ug/kg (ppb)

Sample I.D.	Acenaphthene	Acenaphthylene	Anthracene	Fluorene	2-Methyl naphthalene	Naphthalene	Phen- anthrene	Total Low PAHs
CHET-P-01 (C)	13	10	28	24	17	21	77	190
CHET-P-02 (C)	<1.1	<0.95	<0.55	<1	<0.34	<1	4.3	4.3
CHET-P-03 (C)	<1	<0.88	3.4	2.6	2.6	4.2	5.9	18.7
Screen level (SL)	500	560	960	540	670	2100	1500	5200
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)								

Table 10. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
High Molecular Weight Analytes, Laboratory Analysis #1
ug/kg (ppb)

Sample I.D.	Benzo(a)-anthracene	Benzo(b)-fluoroanthene	Benzo(k)-fluoroanthene	Benzo-(g,h,i)-perylene	Chrysene	Pyrene	Benzo(a)-pyrene	Dibenz(a,h)-anthracene	Indeno-(1,2,3-cd)-pyrene	Fluoranthene	Total High PAHs
CHET-P-01 (A)	20	34	15	5.2	50	51	16	<0.8	<0.8	66	257.2
CHET-P-02 (A)	8.5	9.9	<1	<0.39	9.9	21	4.5	<0.55	<0.55	23	76.8
CHET-P-03 (A)	21	22	9.7	<0.39	32	30	14	<0.55	4.5	31	164.2
Screen level (SL)	1300	b + k = 3200		670	1400	2600	1600	230	600	1700	12000
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).											

Table 11. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
High Molecular Weight Analytes, Laboratory Analysis #2
ug/kg (ppb)

Sample I.D.	Benzo(a)-anthracene	Benzo(b)-fluro-anthene	Benzo(k)-fluro-anthene	Benzo-(g,h,i)-perylene	Chrysene	Pyrene	Benzo(a)-pyrene	Dibenz(a,h)-anthracene	Indeno-(1,2,3-cd)-pyrene	Fluor-anthene	Total High PAHs
CHET-P-01 (B)	24	20	<1.5	<0.55	38	26	8.4	<0.78	<0.78	31	147.4
CHET-P-02 (B)	4.9	4.7	<1.1	<0.4	4.9	4.2	<1.4	<0.57	<0.57	5.4	24.1
CHET-P-03 (B)	<1.3	4.5	<0.94	<0.36	4.8	8	3.2	<0.5	<0.5	10	30.5
Screen level (SL)	1300	b + k = 3200		670	1400	2600	1600	230	600	1700	12000
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).											

Table 12. Chetco River and Boat Basin

Sampled August 21, 2001

Polynuclear Aromatic Hydrocarbons (PAHs)
High Molecular Weight Analytes, Laboratory Analysis #3
ug/kg (ppb)

Sample I.D.	Benzo(a)-anthracene	Benzo(b)-fluro-anthene	Benzo(k)-fluro-anthene	Benzo-(g,h,i)-perylene	Chrysene	Pyrene	Benzo(a)-pyrene	Dibenz(a,h)-anthracene	Indeno-(1,2,3-cd)-pyrene	Fluor-anthene	Total High PAHs
CHET-P-01 (C)	56	58	31	<0.57	80	120	26	<0.8	9.3	140	520.3
CHET-P-02 (C)	3 J	4.3	<0.95	<0.36	3.9 J	9.6	<1.3	<0.51	<0.51	14	34.8
CHET-P-03 (C)	3.4 J	7.7	<0.88	<0.33	6.9	11	<1.2	<0.47	<0.47	8.9	37.9
Screen level (SL)	1300	b + k = 3200		670	1400	2600	1600	230	600	1700	12000
J = Estimated value (reported values are above the MDL, but below the PQL). Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).											

Figure 1. Chetco River Channel Sampling Locations

